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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WOODS, ERIC V	
ART UNIT	**PAPER NUMBER**
2628	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/648,301	KOMARECHKA, ROBERT	
	Examiner	Art Unit	
	Eric Woods	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 September 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 6-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 6-14 is/are rejected.

7)☒ Claim(s) 15-20 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments are moot, as they are directed to the newly presented claims, which have never been the subject of any ground(s) of rejection.

The instant application was revived upon the granting of the petition filed 9/29/2006.

Claims 1-5 were canceled, with a new slate of claims (6-20) newly presented, in a response to a Non-Final Office Action.

It is noted that the current application would have supported a claim for foreign priority, based on the CA 2400545 application. However, since over 30 months have elapsed since the filing of the US application, such a priority claim cannot be made.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al ("Combined 3-D Interpretation of Airborne, Surface, and Borehole Vector Magnetics at the McConnell Nickel Deposit") in view of AAPA (Applicant's Admitted Prior Art (AAPA), Clymer (US 6,242,907 B1), Sano (US 5,701,897), Jacob et al (US PGPub 2005/0165308 A1), Namekawa (US 4,768,515). (Henceforth known as MACSJN).

As to claim 6,

Mueller teaches or partially teaches the following limitations:

A method for displaying three-dimensional vector orientations on a two-dimensional surface comprising the following steps: (Mueller, Figures 1, 7-9, 10)

A. Establishing a sampling grid over an area of geological interest having properties capable of representation by Cartesian vectors; (Mueller, p660, "Surface Magnetics," "Measurement of total magnetic field and the vertical gradient of the total magnetic field were conducted at a 200m line spacing ... Magnetic lows on the east and west sides of the deposit are **gridding artifacts.** Figure 5 shows gridded study area (Local geology section, page 659). Mueller further teaches that magnetic data in 3-D format, e.g. three-dimensional magnetic vector data p665, "Conclusions")

C. Creating a two-dimensional map of the sampling grid; (Mueller clearly shows two-dimensional maps generated, e.g. see Figures 3-5, 7-9, etc, clearly the grid mapping is created)

H. Applying said color model to said two-dimensional map thereby forming a pixilated representation of three-dimensional data in two-dimensional format wherein

the pixilated presentation discloses interpretable data based on said color hues. (Mueller clearly teaches that in Figures 7-9 the data is applied to a given map, e.g. that shown in Figure 5, where such data is clearly a pixilated representation of total magnetic data (which is specified to be three-dimensional). Therefore, since the total data would be three-dimensional and all vector components would be shown on the two-dimensional format, that meets the limitations of this claim. The application of such data to the maps as shown in Mueller would be obvious.)

Mueller partially teaches the following limitations:

B. Locating equally spaced measuring stations for measuring said properties on said sampling grid, wherein said measuring stations are designated by the letters; (Clearly, Mueller teaches locating grid points and measuring such properties on said sampling grid. Clearly, labeling of grid points is an arbitrary matter; any system of nomenclature is acceptable for doing so. The system will function without it; See *In re Karlson* (CCPA) 136 USPQ 184 (1963). Further, such labeling results in no functional change to system, which could be regarded as printed matter and excluded under *In re Ngai*, 367 F.3d 1336, 1339, 70 USPQ2d 1862, 1864 (Fed. Cir. 2004). Finally, choice of grid point labeling could be regarded as an aesthetic, design choice issue. However, Mueller does not expressly teach locating a plurality of equally spaced measuring stations.)

D. Obtaining field measurements of the properties at each of said measuring stations and recording the time at which said measurements were taken wherein

said step of obtaining field measurements occurs over a defined period of time; (Mueller teaches obtaining field properties at multiple points over the grid, e.g. "Surface Magnetics" p661-662, but does not expressly teach obtaining field measurements over a period of time.)

E. Correcting the field measurements by applying correction means; (This is an unclear definition – it is unclear how applicant means to correct the data. Mueller clearly states removing the IGRF from the data (e.g. caption for Figure 7), but otherwise does not, per se, teach correcting such data, and does not go into detail as how to such correction is effected)(Clymer teaches that orthogonal vector components are converted to spherical coordinates in order to obtain true measurements and orientations of Earth's magnetic field, angular displacement, and the like, a more specific form of the above and also provides detail – 7:50-67. It therefore would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mueller such that the sensors utilized were corrected such that the reference magnetic field could be determined so that the Earth's magnetic field at that point could be truly known in order to eliminate it to determining the remaining remnant phase; see discussion in Mueller)

AAPA partially teaches the following limitations:

B. Locating equally spaced measuring stations for measuring said properties on said sampling grid, wherein said measuring stations are designated by the letters; (AAPA teaches a plurality of equally spaced measuring stations on a measuring grid

6:1-15. AAPA also clearly stores the data associated with a particular grid point, which is functionally equivalent to labeling.)

D. Obtaining field measurements of the properties at each of said measuring stations and recording the time at which said measurements were taken wherein said step of obtaining field measurements occurs over a defined period of time; (AAPA teaches that field measurements are taken at each of the grid locations, and examiner takes Official Notice that it is old and well known within the measurement art to time-average signals, e.g. to take a plurality of measurements from a sensor over a given time period because this allows averaging them to avoid spurious measurements, noise in the sensor, etc, that occur over very short time periods). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mueller to utilize the techniques of AAPA because: (1) they allow obtaining the full vector characterization of magnetic field at a given location (6:1-15, 4:25-5:5), which is an advantage over the prior art (4:14-23), and clearly allow more information to be obtained.)

Clymer partially teaches the following limitations:

E. Correcting the field measurements by applying correction means; (Clymer teaches that orthogonal vector components are converted to spherical coordinates in order to obtain true measurements and orientations of Earth's magnetic field, angular displacement, and the like, a more specific form of the above and also provides detail – 7:50-67, and also teaches adjusting offsets (8:60-9:15), and the

like. It therefore would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Mueller / AAPA such that the sensors utilized were corrected such that the reference magnetic field could be determined so that the Earth's magnetic field at that point could be truly known in order to eliminate it to determining the remaining remnant phase; see discussion in Mueller)

F. Converting said Cartesian coordinates to mathematical spherical coordinates; (Mueller and AAPA fail to teach this step. Clymer teaches this limitation as above, and it would have been obvious to convert all data points to spherical coordinates in order that such corrections would be applied to all data points. The order steps are performed in does not matter if end result is the same, barring new or unexpected results – see MPEP 2144.04(IV)(C) [R-1] See also In re Burhans, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results); In re Gibson, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is prima facie obvious.). It was old and well-known in the art at the time the invention to perform conversion of rectangular coordinates to spherical coordinates for purposes of data visualization because such spherical coordinates enable faster and less computationally intense rotation and displacement operations for viewing such data during visualization.)

Sano, Jacob, and Namekawa teach the following limitation:

G. Applying a color model to said mathematical spherical coordinates wherein said color model creates color hues that are representative of the magnitude and direction of said mathematical spherical coordinates at each of the measuring stations; and (Mueller, AAPA, and Clymer fail to expressly teach item 7, although it is noted that AAPA discusses a reference (6:18-25) that describes a method of repeating electromagnetic field vectors over a two-dimensional surface (e.g. map), and shaded magnitude contours and directed vector lines are used to characterize the vector field, which therefore would motivate a search for other methods of visualizing three-dimensional vector data (e.g. same problem-solving area). Sano expressly teaches applying a color model to data in polar coordinate form, as shown in Figures 32-33 and especially Figure 35, which shows a polar coordinate system implementation of a color-based system, wherein colors are scored as shown in the color table in Figure 36; the magnitude of the velocity vector is shown by a brightening of the specific color such that increasing brightness (luminance) shows increasing velocity and the specific color shows the direction of movement (19:9-51). Further, it was well known in the art at the time the invention was made that ultrasound imaging was done in three-dimensional mode (Jacob, Abstract, [0001,0006,0016,0024], etc), and it would have been obvious to one of ordinary skill in the art to extend the direction-noting capability of Sano to a three-dimensional capability that could function in such a three-dimensional implementation of such system (ultrasound). Therefore, having established that it would have been obvious to use color-coding schema of Sano in a three-dimensional visualization of spherical

data, it would have been obvious that such schemes should be applied to visualizations of other data types that were in three-dimensional spherical data form, e.g. the vector data provided by Mueller as modified by AAPA / Clymer above, for at least the fact that (18:40-50, 19:45-55, etc) such color-based illustration clearly depicts the direction that the vector is traveling in a clear manner without ambiguity or necessity of other visual annotation (where such is old and is well known in the art; that is, having the angle of the vector represent the hue and the brightness represent the magnitude, because this leads to easily interpretable graphs that are intuitive to read; see for example the system of Namekawa (US 4,768,515) that (see Figure 4; Abstract, 2:10-3:5), such that the direction is determined by the color / hue, spanning the entire range of visible colors, and brightness determines the velocity thereof). [It is respectfully noted that applicant's invention consists of a similar implementation, e.g. the application of an HSV color space to the spherical data such that the direction is clearly derived from HS and the brightness constitutes magnitude.] Therefore, for at least the above reasons, it would have been obvious to modify the Mueller, AAPA, Clymer system as taught by Sano as instructed and evinced by Jacob and Namekawa in order to allow more effective visualization of the recited data)

As to claim 7, this claim is similar to claim 6, with the following additional limitations, covered below:

(A) – Mueller teaches Magnetic Fields (see Title, Abstract, pages 1-2)

(D) – Mueller teaches taking magnetic field measurements at each station (Figures 7-9, pages 660, 662-663, where such measurements are found to be Cartesian coordinates). However, Mueller fails to expressly teach that the measurements at each point on the surface consist of three-direction magnetic vector data. AAPA clearly describes the use of tri-axial magnetometers (6:2-15, 4:22-5:5), where such systems are also described in Mueller that borehole data is taken using this kind of system (Conclusions, page 665). Therefore, the use of such systems would have been obvious in the system of Mueller for all measurements as it allows for the taking of more accurate data for measuring the total magnetic flux (see for example Thurston)). Finally, the labeling of such grid stations would be *prima facie* obvious as explained with respect to item (b) in claim 6 above.)

(G) – Mueller already shows magnetic field data so it would prima facie be shown.

Claim 8 is rejected under 35 USC 103(a) as unpatentable over MACJSN in view of Fox (US 6,191,587 B1)

As to claim 8, (A) MAFJSN does not expressly teach the use of a calibration station but Fox teaches the use of such a system (7:20-30), that being a stationary (fixed) tri-axial magnetometer (tri-axial being inherent if the unit can measure three axes) 8:40-45, etc, where clearly such station is located in the middle of ('proximate to') the sampling grid (see Figure 2, items 16 and 18). Further, Fox teaches the calibration step – 5:1-20, 'radius of correction' 7:20-30 'suitable low-noise environment' ('fixed quiet remote station'). It would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify MAFJSN to utilize such a base station because 8:55-9:15 this allows for effective measurement of the local magnetic environment for purposes of obtaining a "local" reference value to null later on (9:50-65).

Claims 9-14 are rejected under 35 USC 103(a) as unpatentable over MACSJNF in view of Palstra et al (US 5,694,037).

As to claim 9, as noted above in the rejection to claim 8, MFCSJNF teach or suggest the following limitations:

(A) Mueller and AAPA teach the obtaining of the reference measurement by the stationary tri-axial magnetometer, where clearly such measurements are in (X, Y, Z) directions using the first magnetometer, as noted in the rejection to claim 8 above. (Note also Clymer 9:29-40)

(B) Mueller fails to expressly teach a portable magnetometer, but AAPA (6:1-17) clearly teach an operator held portable tri-axial magnetometer.

However, MACSJNF fail to expressly teach the use of a system that specifically takes into account the effect of the operator holding the device. Palstra teaches such a device, with flux-gate magnetometer, contemplated by Clymer (4:30-40).

(C) The effects of the operator holding the device are determined (Palstra Abstract, Figure 2, steps 46-56 to create and store the calibration matrix, wherein such system is held by the operator – 5:55-5:10)

(D) The system clearly can be calibrated (Palstra Figures 2 and3, e.g. calibrating the device such that the effects are nullified, and sense the positioning into various orientations can be done manually, *prima facie* the effects of the operator will be nullified - 8:60-9:15)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the calibration procedure that takes the user into account to allow for more accurate measurements, since the system of MACSJNF does not expressly do so. (2:10-21, 5:45-6:10, 7:20-30, 8:25-45, etc, Palstra).

As to claim 10, MF-SJN fails to expressly teach, while both Clymer and Palstra teach the use of a portable magnetometer to take measurements.

Mueller teaches the measurement of various spots on the recited grid (as disclosed in the rejection to claim 7 above), which would implicitly teach a portable magnetic field measuring device, where AAPA teaches such a device (6:1-15, which is taught to be three-dimensional). AAPA teaches taking measurements at each grid point, and would imply and teach – as above – taking measurements over a period of time to obtain an average measurement, and that such measurements are taken in Cartesian (X, Y, Z) coordinates.

Fox teaches taking these measurements are taken for a known duration (Fox, 7:55-8:21, Figure 2), where clearly these measurements are stored with information regarding their position (see Fox, wherein such receivers have GPS and timestamping / logging – Figure 4, element 64, 8:30-41. Also, Fox clearly stores the data associated

with a particular grid point, which is functionally equivalent to the recited labeling.) Such motivation is taken from the rejections to claims 6 and 9 above.

As to claim 11, MACJSNF fail to expressly teach averaging the magnetic field, but Palstra implicitly teaches the limitation because the system takes some time to calibrate (e.g. 6:28-45), where clearly since the system samples at (5:8-48) 60Hz, which therefore would implicitly sample for at least a second, which would therefore teach 'determining an average magnetic field measurement over the period of time in order to obtain a calibration value corresponding to the time that the magnetic field measurements are made'. Motivation is taken from the rejection to claim 10 above.

As to claim 12, MA-JSNF fail to expressly teach subtracting said calibration value although Clymer teaches subtracting offsets from the measured field (8:64-9:10), where this is more expressly spelled out by Palstra, in that when the system is calibrated, as in step 56 in Figure 2, specifically in step 76 in Figure 3 – Subtract Offset Value from Measured Magnetic Field Values (8:43-55), wherein this consists of subtracting the calibration value to obtain calibrated outputs (end result of step 58 / Figure 2; step 80, Figure 3).

As to claims 13 and 14, Mueller does clearly suggest removing the Earth's magnetic field from measured magnetic field data by noting that magnetic field measurements are calculated in Figure 7 with the IGRF (International Geomagnetic Reference Field) removed. The IGRF is well known to one of ordinary skill in the art to be the accepted model for Earth's magnetic field, and would have to be removed to obtain the recited remnant magnetic values (see AAPA 5:9-30).

Allowable Subject Matter

Claims 15-20 stand objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Eric Woods 4/9/2007

UChauhan

Ulka Chauhan

Supervisory Patent Examiner